

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

JP069 U.S. PTO
10/053758
01/18/02

In re application of:

Cech et al.

Application No.: To be assigned

Filed: Herewith

For: Novel Telomerase

Examiner: To Be Assigned

Art Unit: To Be Assigned

INFORMATION DISCLOSURE
STATEMENT UNDER 37 CFR §1.97 and
§1.98

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

The references cited on attached form PTO/SB/08A and PTO/SB/08B are being called to the attention of the Examiner. In accordance with 37 CFR §1.98(d), copies of references Q-S can be found in co-pending parent Application No. 09/843,676, filed April 26, 2001 (Attorney Docket no. 015389-002943US). Copies of the other references can be found in parent Application No. 08/854,050, filed May 9, 1997, now U.S. Patent No. 6,261,836 (Attorney Docket No.: 015389-002940US). If the examiner would like additional copies of these references, applicants will happily provide them.

It is respectfully requested that the cited information be expressly considered during the prosecution of this application, and the reference be made of record therein and appear among the "references cited" on any patent to issue therefrom.

As provided for by 37 CFR 1.97(g) and (h), no inference should be made that the information and references cited are prior art merely because they are in this statement and no representation is being made that a search has been conducted or that this statement encompasses all the possible relevant information.

Applicant believes that no fee is required for submission of this statement, since it is being submitted prior to the first Office Action. However, if a fee is required, the Commissioner is authorized to deduct such fee from the undersigned's Deposit Account No.

Respectfully submitted,



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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet **Page 1** of **10**

Complete if Known

Application Number	To be assigned
Filing Date	Herewith
First Named Inventor	Cech, Thomas R.
Group Art Unit	To Be Assigned
Examiner Name	To Be Assigned
Attorney Docket Number	015389-002980US

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U.S. PATENT DOCUMENTS

Examiner Initials *	Cite No. ¹	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code ² (if known)			
	A	3,817,837		Tanenholtz <i>et al.</i>	06-18-74	
	B	3,850,752		Schuurs <i>et al.</i>	11-26-74	
	C	3,939,350		Kronick <i>et al.</i>	02-17-76	
	D	3,996,345		Ullman <i>et al.</i>	12-01-76	
	E	4,275,149		Litman <i>et al.</i>	06-23-81	
	F	4,277,437		Maggio	07-07-81	
	G	4,366,241		Tom <i>et al.</i>	12-28-82	
	H	4,683,195		Mullis <i>et al.</i>	07-28-87	
	I	4,683,202		Mullis	07-28-87	
	J	4,816,567		Cabilly <i>et al.</i>	03-28-89	
	K	4,965,188		Mullis <i>et al.</i>	10-23-90	
	L	5,489,508		West <i>et al.</i>	02-06-96	
	M	5,583,016		Villeponteau <i>et al.</i>	12-10-96	
	N	5,747,317		Cao	05-05-98	
	O	5,770,422		Collins	06-23-98	
	P	6,093,809		Cech, <i>et al.</i>	07/25/00	
	Q	6,258,535	B1	Villeponteau <i>et al.</i>	07-10-01	
	R	6,261,556	B1	Weinrich <i>et al.</i>	07-17-01	
	S	6,261,836	B1	Cech <i>et al.</i>	07-17-01	

FOREIGN PATENT DOCUMENTS

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		Office ³	Number ⁴	Kind Code ⁵ (if known)				
	T	JP	09154575-A			06-17-97		
	U	PCT	WO 93/23572			11/93		
	V	PCT	WO 95/13382			5/95		
	W	PCT	WO 96/01835			01-25-96		
	X	PCT	WO 96/12811			05-02-96		
	Y	PCT	WO 96/19580			06-27-96		
	Z	PCT	WO 96/40868			12-19-96		
	AA	PCT	WO 98/01542			01-15-98		
	AB	PCT	WO 98/01543			01-15-98		
	AC	PCT	WO 98/07838			03-05-98		
	AD	PCT	WO 98/08938			02-26-98		

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	AE	PCT	WO 98/21343			05-22-98		
	AF	PCT	WO 98/23759			06-98		
	AG	PCT	WO 98/37181			08-27-98		
	AH	PCT	WO 98/45450			10-15-98		
	AI	PCT	WO98/59040			12-30-98		
	AJ	PCT	WO99/01560			01-14-99		

OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS

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	AK	1994 Genome Issue of <i>Science</i> (265:1981f)	
	AL	Anderson and Young, "Quantitative Filter Hybridization" in <i>Nucleic Acid Hybridization</i> pp73-111 (1985)	
	AM	Ausubel <i>et al.</i> , <i>Current Protocols in Molecular Biology</i> , John Wiley & Sons, New York NY (1989)	
	AN	Autexier <i>et al.</i> , "Reconstitution of human telomerase activity and identification of a minimal functional region of the human telomerase RNA," (1996) <i>EMBO J</i> , 15:5928	
	AO	Autexier, C. <i>et al.</i> , "Telomerase and cancer: revisiting the telomere hypothesis," <i>Trends in Biochemical Sciences</i> , 10 (21): 387-391 (1996).	
	AP	Auxexier and Greider, "Functional reconstitution of wild-type and mutant <i>Tetrahymena</i> telomerase," (1994) <i>Genes Develop.</i> , 8:563	
	AQ	Avilion, A., "Characterization and expression of human telomerase," <i>Dissertation Abstracts International</i> , 56 (11) 5930-B (1996).	
	AR	Barinaga, M., "The Telomerase Picture Fills In," <i>Science</i> 276:528-529 (1997).	
	AS	Berger and Kimmel, <i>Guide to Molecular Cloning Techniques</i> , Meth. Enzymol., vol. 152, Academic Press, San Diego CA (1987)	

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	AT	Biessmann et al., "Addition of Telomere-Associated HeT DNA Sequences "Heals" Broken Chromosome Ends in Drosophila," Cell 61:663 [1990].	
	AU	Bitter et al., "Expression and secretion vectors for yeast," Meth Enzymol., (1987) 153:516	
	AV	Blackburn and Chiou, "Non-nucleosomal packaging of a tandemly repeated DNA sequence at termini of extrachromosomal DNA coding for rRNA in Tetrahymena," (1981) Proc. Natl. Acad. Sci., 78:2263	
	AW	Blackburn and Gall, "A tandemly repeated sequence at the termini of the extrachromosomal ribosomal RNA genes in Tetrahymena," (1978) J. Mol. Biol., 120:33	
	AX	Blackburn, "Telomerases," (1992) Ann. Rev. Biochem., 61:113	
	AY	Bodnar et al., "Extension of Life-Span by Introduction of Telomerase into Normal Human Cells," (1998) Science, 279:349	
	AZ	Bradford, "A Rapid and Sensitive method for the Quantitation of Microgram Quantities of Protein Utilizing the Principle of Protein-Dye Binding," (1976) Anal. Biochem., 72:248	
	BA	Braunstein et al., "Transcriptional silencing in yeast is associated with reduced nucleosome acetylation," (1993) Genes Develop., 7:592	
	BB	Calvio et al., "Identification of hnRNP P2 as TLS/FUS using electrospray mass spectrometry," (1995) RNA, 1:724	
	BC	Caruthers et al., "New chemical methods for synthesizing polynucleotides," (1980) Nucleic Acids Res. Symp. Ser., 215-223	
	BD	Chan and Tye, "Organization of DNA sequences and replication origins at yeast telomeres," (1983) Cell, 33:563	
	BE	Colbere-Garapin et al., "A new dominant hybrid selective marker for higher eukaryotic cells," (1981) J. Mol. Biol., 150:1	
	BF	Cole et al., "The EBV-hybridoma technique and its application to human lung cancer," Monoclonal Antibodies and Cancer Therapy, Alan R. Liss Inc., New York NY 77-96 (1985)	
	BG	Collins et al., "Purification of Tetrahymena telomerase and cloning of genes encoding the two protein components of the enzyme," (1995) Cell, 81:677	
	BH	Collins, K., "Structure and Function of Telomerase," Curr. Op. Cell. Biol. 8:374-380 (1996).	

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	BI	Conrad <i>et al.</i> , "RAP1 protein interacts with yeast telomeres in vivo: Overproduction alters telomere structure and decreases chromosome stability," (1990) <i>Cell</i> , 63:739	
	BJ	Coombs, <i>Dictionary of Biotechnology</i> , Stockton Press, New York NY (1994)	
	BK	Cote <i>et al.</i> , "Generation of human monoclonal antibodies reactive with cellular antigens," (1983) <i>Proc. Natl. Acad. Sci.</i> , 80:2026	
	BL	Counter <i>et al.</i> , "The catalytic subunit of yeast telomerase," (1997) <i>Proc. Natl. Acad. Sci.</i> , 94:9202	
	BM	Creighton, <i>Proteins, Structures and Molecular Principles</i> , WH Freeman and Co, New York NY [1983].	
	BN	Dieffenbach and Dveksler, <i>PCR Primer, a Laboratory Manual</i> , Cold Spring Harbor Press, Plainview NY (1995)	
	BO	Duplaa <i>et al.</i> , "Quantitative analysis of polymerase chain reaction products using biotinylated dUTP incorporation," (1993) <i>Anal. Biochem.</i> , 212:229	
	BP	Fang <i>et al.</i> , "Oxytricha telomere-binding protein: separable DNA-binding and dimerization domains of the α -subunit," <i>Genes Develop.</i> 7:870 (1993) and Gray <i>et al.</i> , (1991) <i>Cell</i> 67:807	
	BQ	Feng <i>et al.</i> , "The RNA Component of Human Telomerase," (1995) <i>Science</i> , 269:1236	
	BR	GenBank Accession No. AA281296	
	BS	Genbank accession no. AA299878	
	BT	Genbank accession no. AA311750	
	BU	Gilley <i>et al.</i> , "Altering specific telomerase RNA template residues affects active site function," (1995) <i>Genes Develop.</i> 9:2214	
	BV	Gottschling and Cech, "Chromatin Structure of the Molecular Ends of Oxytricha Mononuclear DNA: Phased Nucleosomes and a Telomeric Complex," (1984) <i>Cell</i> , 38:501	
	BW	Gottschling and Zakian, "Telomere proteins: specific recognition and protection of the natural termini of Oxytricha macronuclear DNA," (1986) <i>Cell</i> 47:195	

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Sheet **Page 5** of **10**

OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS

Examiner Initials *	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
	BX	Grant <i>et al.</i> , Meth Enzymol., (1987) 153:516-544	
	BY	Greenwood <i>et al.</i> , "Phylogenetic relationships within the class oligohymenophorea, phylum ciliophora, inferred from the complete small subunit rRNA gene sequences of <i>Colpidium campylum</i> , <i>Glaucoma chattoni</i> , and <i>Opisthonecta henneguyi</i> ," (1991) <i>J. Mol. Evol.</i> , 3:163	
	BZ	Greider and Blackburn, "A telomeric sequence in the RNA of Tetrahymena telomerase required for telomere repeat synthesis," (1989) <i>Nature</i> , 337:331	
	CA	Greider and Blackburn, "Identification of a specific telomere terminal transferase activity in Tetrahymena extracts," (1985) <i>Cell</i> , 43:405	
	CB	Greider, "Telomerase is processive," (1991) <i>Mol. Cell. Biol.</i> , 11:4572	
	CC	Greider, "Telomere Length Regulation," (1996) <i>Ann. Rev. Biochem.</i> , 65:337	
	CD	Hampton <i>et al.</i> , <i>Serological Methods a Laboratory Manual</i> , APS Press, St Paul MN (1990)	
	CE	Harrington <i>et al.</i> , "A Mammalian Telomerase-Associated Protein," (1997) <i>Science</i> , 275:973	
	CF	Harrington <i>et al.</i> , "Human telomerase contains evolutionarily conserved catalytic and structural subunits," (1997) <i>Genes Dev.</i> , 11:3109	
	CG	Hartman and Mulligan, "Two dominant-acting selectable markers for gene transfer studies in mammalian cells," (1988) <i>Proc. Natl. Acad. Sci.</i> , 85:8047	
	CH	Henderson and Blackburn, "An overhanging 3' terminus is a conserved feature of telomeres," (1989) <i>Mol Cell. Biol.</i> , 9:345	
	CI	Hillier, <i>et al.</i> , Direct Submission to GenBank, EST Database, Accession No. W70315, Available Oct. 17, 1996.	
	CJ	Horn <i>et al.</i> , "Synthesis of oligonucleotides on cellulose. Part II: design and synthetic strategy to the synthesis of 22 oligodeoxynucleotides coding for gastric inhibitory polypeptide (GIP)," (1980) <i>Nucleic Acids Res. Symp. Ser.</i> , 225-232	
	CK	Hudson <i>et al.</i> , "An STS-based map of the human genome," (1995) <i>Science</i> , 270:1945	
	CL	Huse <i>et al.</i> , "Generation of a large combinatorial library of the immunoglobulin repertoire in phage lambda," (1989) <i>Science</i> , 246:1275	

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	CM	Kilian <i>et al.</i> , "Isolation of a candidate human telomerase catalytic subunit gene, which reveals complex splicing patterns in different cell types," (1997) <i>Hum. Mol. Genet.</i> , 6:2011	
	CN	Kipling and Cooke, "Hypervariable ultra-long telomeres in mice," (1990) <i>Nature</i> 347:400	
	CO	Klobutcher <i>et al.</i> , "All gene-sized DNA molecules in four species of hypotrichs have the same terminal sequence and an unusual 3' terminus," (1981) <i>Proc. Natl. Acad. Sci.</i> , 78:3015	
	CP	Koehler and Milstein, "Continuous cultures of fused cells secreting antibody of predefined specificity," (1975) <i>Nature</i> 256:495	
	CQ	Kosbor <i>et al.</i> , "The production of monoclonal antibodies from human lymphocytes," (1983) <i>Immunol. Today</i> 4:72	
	CR	Lamond and Sproat, (1994) "Isolation and Characterization of Ribonucleoprotein Complexes," pp103-140	
	CS	Lamond <i>et al.</i> , "Probing the structure and function of U2 snRNP with antisense oligonucleotides made of 2'-OMe RNA," (1989) <i>Cell</i> , 58:383	
	CT	Lendvay <i>et al.</i> , "Senescence mutants of <i>Saccharomyces cerevisiae</i> with a defect in telomere replication identify three additional EST genes," (1996) <i>Genetics</i> , 144	
	CU	Lingner <i>et al.</i> , "Purification of telomerase from <i>Euplotes aediculatus</i> : requirement of a primer 3' overhang," (1996) <i>Proc. Natl. Acad. Sci.</i> , 93:10712	
	CV	Lingner <i>et al.</i> , "Reverse transcriptase motifs in the catalytic subunit of telomerase," (1997) <i>Science</i> , 276:561	
	CW	Lingner <i>et al.</i> , "Telomerase RNAs of different ciliates have a common secondary structure and a permuted template," (1994) <i>Genes Develop.</i> , 8:1984	
	CX	Lingner <i>et al.</i> , "Telomerase and DNA End Replication: No Longer a Lagging Strand Problem?," (1995) <i>Science</i> 269:1533	
	CY	Lowy <i>et al.</i> , "Isolation of transforming DNA: Cloning the hamster apt gene," (1980) <i>Cell</i> , 22:817	
	CZ	Lundblad, V. et al., "RNA-dependent polymerase motifs in EST1: tentative identification of a protein component of an essential yeast telomerase," <i>Cell</i> , 60 (5):29-30 (1990).	
	DA	Lustig and Petes, Identification of yeast mutants with altered telomere structure," (1986) <i>Proc. Natl. Acad. Sci.</i> , 83:1398	

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	DB	Lustig, A., "The Identification of Telomerase Subunits: Catalysing Telomere Research," Trends Cell. Biol. 7:299-302 (1997).	
	DC	Maddox <i>et al.</i> , "Elevated serum levels in human pregnancy of a molecule immunochemically similar to eosinophil granule major basic protein," (1983) <i>J. Exp. Med.</i> , 158:1211	
	DD	Makarov <i>et al.</i> , "Nucleosomal Organization of Telomere-Specific Chromatin in Rat," (1993) <i>Cell</i> , 73:775	
	DE	McEachern and Blackburn, "runaway telomere elongation caused by telomerase RNA gene mutation," (1995) <i>Nature</i> , 376:403	
	DF	Melby <i>et al.</i> , "Quantitative measurement of human cytokine gene expression by polymerase chain reaction," (1993) <i>J. Immunol. Meth.</i> , 159:235	
	DG	Merrifield, "Solid phase peptide synthesis. I. The synthesis of a tetrapeptide," (1963) <i>J. Am. Chem. Soc.</i> , 85:2149	
	DH	Meyerson <i>et al.</i> , "hEST2, the Putative Human Telomerase Catalytic Subunit Gene, Is Up-Regulated in Tumor Cells and during Immortalization," (1997) <i>Cell</i> , 90:785	
	DI	Murray, <i>In McGraw Hill Yearbook of Science and Technology</i> , (1992) McGraw Hill, New York NY, pp 191-196	
	DJ	Nakamura <i>et al.</i> , "Telomerase Catalytic Subunit Homologs from Fission Yeast and Human," (1997) <i>Science</i> , 277:955	
	DK	Nakayama <i>et al.</i> , "Cloning of a Candidate cDNA Encoding a Proteinaceous Component of Mammalian Telomerase," <i>Mol. Biol. Cell. Abstracts Supp.</i> 7 p. 286a, .sctn. 1664 (1996).	
	DL	Nakayama <i>et al.</i> , "TLP1: A Gene Encoding a Protein Component of Mammalian Telomerase Is a Novel Member of WD Repeats Family," (1997) <i>Cell</i> , 88:875	
	DM	Nielsen <i>et al.</i> , (1993) "Peptide nucleic acids (PNAs): Potential antisense and anti-gene agents," <i>Anticancer Drug Des.</i> , 8:53	
	DN	Oka <i>et al.</i> , "Inverted terminal repeat sequence in the macronuclear DNA of <i>Stylonychia pustulata</i> ," (1980) <i>Gene</i> , 10:301	
	DO	Olovnikov, "A theory of marginotomy: The incomplete copying of template margin in enzymic synthesis of polynucleotides and biological significance of the phenomenon," (1973) <i>J. Theor. Biol.</i> , 41:181	
	DP	Orlandi <i>et al.</i> , "Cloning immunoglobulin variable domains for expression by the polymerase chain reaction," (1989) <i>Proc. Natl. Acad. Sci.</i> , 86:3833	

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Application Number	To be assigned
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First Named Inventor	Cech, Thomas R.
Group Art Unit	To Be Assigned
Examiner Name	To Be Assigned
Attorney Docket Number	015389-002980US

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	DQ	Prescott, "The DNA of ciliated protozoa," (1994) <i>Microbiol. Rev.</i> , 58:233	
	DR	Price, (1993) <i>Blood Rev.</i> , 7:127	
	DS	Rhodes <i>et al.</i> , "Transformation of maize by electroporation of embryos," (1995) <i>Meth. Mol. Biol.</i> , 55:121	
	DT	Roberge <i>et al.</i> , "A strategy for a convergent synthesis of N-linked glycopeptides on a solid support," (1995) <i>Science</i> , 269:202	
	DU	Romero and Blackburn, "A conserved secondary structure for telomerase RNA," (1991) <i>Cell</i> , 67:343	
	DV	Sambrook <i>et al.</i> , <i>Molecular Cloning, A Laboratory Manual</i> , Cold Spring Harbor Press, Plainview NY (1989)	
	DW	Sandell <i>et al.</i> , "Transcription of yeast telomere alleviates telomere position effect without affecting chromosome stability," (1994) <i>Proc. Natl. Acad. Sci.</i> , 91:12061	
	DX	Sanger <i>et al.</i> , "DNA sequencing with chain-terminating inhibitors," <i>Proc. Natl. Acad. Sci.</i> , 74:5463 [1977].	
	DY	Scharf <i>et al.</i> , "Heat stress promoters and transcription factors," (1994) <i>Result Probl. Cell Differ.</i> 20:125	
	DZ	Shampay and Blackburn, "Generation of telomere-length heterogeneity in <i>Saccharomyces cerevisiae</i> ," (1988) <i>Proc. Natl. Acad. Sci.</i> , 85:534	
	EA	Sheen and Levis, "Transposition of the LINE-like retrotransposon TART to <i>Drosophila</i> chromosome termini," (1994) <i>Proc. Natl. Acad. Sci.</i> , 91:12510	
	EB	Singer and Gottschling, "TLC1: Template RNA Component of <i>Saccharomyces cerevisiae</i> Telomerase," (1994) <i>Science</i> 266:404	
	EC	Singer, M., "Unusual Reverse Transcriptases," <i>J. Biol. Chem.</i> 270(42):24623-24626 (1995).	
	ED	Starling <i>et al.</i> , "Extensive telomere repeat arrays in mouse are hypervariable," (1990) <i>Nucleic Acids Res.</i> , 18:6881	
	EE	Swanton <i>et al.</i> , "Arrangement of Coding and Non-coding Sequences in the DNA Molecules Coding for rRNAs in <i>Oxytricha</i> sp.," (1980) <i>Chromosoma</i> 77:203	

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	EF	Tommerup <i>et al.</i> , "Unusual chromatin in human telomeres," (1994) <i>Mol. Cell. Biol.</i> , 14:5777	
	EG	Trask, "Fluorescence in situ hybridization: application in cytogenetics and gene mapping," (1991) <i>Trends Genet.</i> , 7:149	
	EH	Verma <i>et al.</i> , "Human Chromosomes: A Manual of Basic Techniques," Pergamon Press, New York NY (1988)	
	EI	Watson, "Origin of concatemeric T7 DNA," (1972) <i>Nature New Biol.</i> , 239:197	
	EJ	Weinrich <i>et al.</i> , "Reconstitution of human telomerase with the template RNA component hTR and the catalytic protein subunit hTERT," (1997) <i>Nat. Genet.</i> , 17(4):498	
	EK	Wellinger <i>et al.</i> , "Origin activation and formation of single-strand TG ₁₋₃ tails occur sequentially in late S phase on a Yeast linear plasmid," (1993) <i>Mol. Cell. Biol.</i> , 13:4057	
	EL	Wellinger <i>et al.</i> , "Saccharomyces Telomeres Acquire Single-Strand TG ₁₋₃ Tails Late in S Phase," (1993) <i>Cell</i> 72:51	
	EM	Whitehead Institute/MIT Center for Genome Research, Genetic Map of the Mouse, Database Release 10, April 28, 1995	
	EN	Wigler <i>et al.</i> , "Transfer of purified herpes virus thymidine kinase gene to cultured mouse cells," (1977) <i>Cell</i> , 11:223	
	EO	Wigler <i>et al.</i> , "Transformation of mammalian cells with an amplifiable dominant-acting gene," (1980) <i>Proc. Natl. Acad. Sci.</i> , 77:3567	
	EP	Winter and Milstein, "Man-made antibodies," (1991) <i>Nature</i> , 349:293	
	EQ	Wright <i>et al.</i> , "Saccharomyces telomeres assume a non-nucleosomal chromatin structure," (1992) <i>Genes Develop.</i> , 6:197	
	ER	Yu <i>et al.</i> , "In vivo alteration of telomere sequences and senescence caused by mutated Tetrahymena telomerase RNAs," (1990) <i>Nature</i> , 344:126	
	ES	Zahler and Prescott, "Telomere terminal transferase activity in the hypotrichous ciliate <i>Oxytricha nova</i> and a model for replication of the ends of linear DNA molecules," (1988) <i>Nucleic Acids Res.</i> , 16:6953	
	ET	Zakian, Telomeres: Beginning to Understand the End," (1995) <i>Science</i> 270:1601	

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	EU	Zaug et al., "Catalysis of RNA Cleavage by a Ribozyme Derived from the Group I Intron of Anabaena Pre-tRNA ^{Leu} ,"	
	EV	Zaug, A. J. et al., "Method for determining RNA 3' ends and application to human telomerase RNA," Nucleic Acids Research, 24 (3): 532-533 (1996).	

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